

Appl. No. 10/801,828  
Amdt. Dated Aug. 4, 2005  
Reply to Office Action of May 4, 2005

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings of claims in the application:

**Listing of Claims:**

**Claim 1 (currently amended): A thin film transistor, comprising:**

a substrate;

a gate electrode disposed in the substrate, the gate electrode being made of metallic material;

a gate insulation layer disposed on the substrate and gate electrode;

a channel layer disposed on the gate insulation layer;

a source ohmic contact layer and a drain ohmic contact layer arranged on opposite ends of the channel layer;

a source electrode disposed on the substrate and source ohmic contact layer; and

a drain electrode disposed on the substrate and drain ohmic contact layer.

**Claim 2 (original): The thin film transistor of claim 1, wherein the surface of the gate electrode is parallel with the surface of the substrate.**

**Claim 3 (canceled)**

**Claim 4 (currently amended): The thin film transistor of claim [[3]] 1, wherein the gate electrode comprises Cu, Al, Ti, Mo, Cr, Ta, Nd or any alloy thereof.**

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**Claim 5 (previously presented):** The thin film transistor of claim 1, wherein a cross-section of the gate electrode is trapezoidal.

**Claim 6 (previously presented):** The thin film transistor of claim 1, wherein a cross-section of the gate electrode is rectangular.

**Claim 7 (previously presented):** The thin film transistor of claim 1, wherein the substrate is made of glass or silicon oxide.

**Claim 8 (previously presented):** The thin film transistor of claim 1, wherein the gate insulation layer is made of silicon nitride or silicon oxide.

**Claim 9 (previously presented):** The thin film transistor of claim 1, wherein the channel layer is made of amorphous silicon or polycrystalline silicon.

**Claim 10 (currently amended):** The thin film transistor of claim 9, wherein the source and drain ohmic contact layers are formed by doping the channel layer.

**Claim 11 (currently amended):** A display device including a plurality of thin film transistors used to control and drive display material, wherein each of the thin film transistors comprises:

a substrate;

a gate electrode disposed in the substrate, the gate electrode being made of metallic material;

a gate insulation layer disposed on the substrate and gate electrode;

a channel layer disposed on the gate insulation layer;

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a source ohmic contact layer and a drain ohmic contact layer arranged on the two sides of the channel layer;

a source electrode disposed on the substrate and source ohmic contact layer; and

a drain electrode disposed on the substrate and drain ohmic contact layer.

**Claim 12 (original):** The display device of claim 11, wherein the display material is liquid crystal.

**Claim 13 (withdrawn):** A method for producing a thin film transistor comprising the steps of:

forming a gate electrode in a substrate by a photo mask process;

forming a gate insulation layer, amorphous silicon layer, phosphor doped amorphous silicon layer;

wiping off two sides of the amorphous silicon layer and phosphor doped amorphous silicon layer;

forming source and drain metal layers;

wiping off the center area of the metal layers;

wiping off the center area of the amorphous silicon layer to form a source ohmic contact layer, a drain ohmic contact layer and a channel layer.

**Claim 14 (withdrawn):** The method for producing a thin film transistor of claim 13, wherein the method of forming the gate insulation layer, the amorphous silicon layer and the phosphor doped amorphous silicon layer is deposit.

**Claim 15 (withdrawn):** The method for producing a thin film

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transistor of claim 13, wherein the method of wiping off the amorphous silicon layer and doping phosphor amorphous silicon layer is photo mask and etching.

Claim 16 (withdrawn): The method for producing a thin film transistor of claim 13, wherein the method of forming the source and drain metal layer is deposit.

Claim 17 (withdrawn): The method for producing a thin film transistor of claim 13, wherein the methods of wiping off the center area of the source and drain metal layer are photo mask and etching.

Claim 18 (withdrawn): The method for producing a thin film transistor of claim 13, wherein the methods of wiping off the center area of the amorphous silicon layer and forming a source ohmic contact layer, a drain ohmic contact layer and a channel layer are dry etching.

Claim 19 (withdrawn): The method for producing a thin film transistor of claim 13, wherein the once photo mask procedure of forming the gate electrode comprising the steps of:

- forming a photo blocking film on the substrate;
- forming a pattern of the gate electrode;
- forming a channel on the substrate;
- depositing metal in the channel;
- forming the gate electrode.

Claim 20 (withdrawn): The method for producing a thin film transistor of claim 19, wherein the method of forming the photo blocking film is covering and baking.

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Claim 21 (currently amended): A thin film transistor comprising:  
a substrate defining a cavity in an upper face thereof;  
a gate electrode filled in said cavity, the gate electrode being made of metallic material;  
a gate insulation layer applied upon said substrate covering both said substrate and said gate electrode;  
a channel layer applied upon said gate insulation layer and only covering a central portion of an upper face of said gate insulation layer;  
a source electrode disposed upon one side of said channel layer and further covering a portion of said gate insulation layer wherein said portion is exposed to an exterior before said source electrode is applied thereto; and  
a drain electrode disposed upon the other side of the channel layer and further covering another portion of said gate insulation layer wherein said another portion is exposed to the exterior before said drain electrode is applied thereto.